

This is a repository copy of *Alcohol consumption among first- and second-generation immigrant and native adolescents in 23 countries: : Testing the importance of origin and receiving country alcohol prevalence rates.*

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/124080/>

Version: Accepted Version

Article:

Barsties, Lisa S., Walsh, Sophie D., Huijts, Timothy Hubertus Maria et al. (6 more authors) (2017) Alcohol consumption among first- and second-generation immigrant and native adolescents in 23 countries: : Testing the importance of origin and receiving country alcohol prevalence rates. *Drug and Alcohol Review*. pp. 769-778. ISSN 1465-3362

<https://doi.org/10.1111/dar.12624>

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



Alcohol consumption among first- and second-generation immigrant and native adolescents in 23 countries: Testing the importance of origin and receiving country alcohol prevalence rates

Journal:	<i>Drug and Alcohol Review</i>
Manuscript ID	CDAR-2016-0165.R3
Manuscript Type:	Original Paper
Date Submitted by the Author:	28-Sep-2017
Complete List of Authors:	Barsties, Lisa; Universiteit Utrecht, Walsh, Sophie; Universitat Bar-Ilan Huijts, Tim; Queen Mary University of London Bendtsen , Pernille; University of Southern Denmark Molcho, Michal; National University of Ireland - Galway Buijs, Thomas; Universiteit Gent Vieno, Alessio; Universita degli Studi di Padova Scuola di Psicologia Elgar, Frank; Institute for Health and Social Policy, McGill University Stevens, Gonneke; Universiteit Utrecht,
Keywords (Please ensure that the Keywords and a short Running Head are also included in the manuscript file):	alcohol consumption, adolescents, immigrants, origin and receiving country alcohol prevalence rates

SCHOLARONE™
Manuscripts

Alcohol consumption among first- and second-generation immigrant and native adolescents in 23 countries: Testing the importance of origin and receiving country alcohol prevalence rates

Running head: Immigration and Alcohol Consumption

LISA S. BARSTIES¹, SOPHIE D. WALSH², TIM HUIJTS³, PERNILLE BENDTSEN⁴,
MICHAL MOLCHO⁵, THOMAS BUIJS⁶, ALESSIO VIENO⁷, FRANK J. ELGAR⁸,
GONNEKE W. J. M. STEVENS¹

¹Utrecht Centre for Child and Adolescent Studies, Utrecht University, Utrecht, The Netherlands,
²Department of Criminology, Bar Ilan University, Ramat Gan, Israel, ³Department of Sociology,
University of York, York, United Kingdom, ⁴National Institute of Public Health, University of
Southern Denmark, Copenhagen, Denmark, ⁵School of Languages, Literature and Culture,
National University of Ireland Galway, Galway, Ireland, ⁶Department of Public Health, Ghent
University, Gent, Belgium, ⁷Department of Developmental and Social Psychology, University of
Padova, Padova, Italy, ⁸Institute for Health and Social Policy, McGill University, Montreal,
Canada

Lisa S. Barsties MSc, Junior Researcher, Sophie D. Walsh PhD, Associate Professor, Tim Huijts
PhD, Senior Lecturer, Pernille Bendtsen PhD, Researcher, Michal Molcho PhD, Senior Lecturer,
Thomas Buijs MSc, Doctoral Researcher, Alessio Vieno PhD, Associate Professor, Frank J.
Elgar PhD, Associate Professor, Gonneke W. J. M. Stevens PhD, Associate Professor.
Correspondence to: Dr Gonneke Stevens, Utrecht Centre for Child and Adolescent Studies,
Utrecht University, P.O. Box 80.140, 3508 TC Utrecht, The Netherlands, Tel: +31 302533488,
Fax: +31 3025347332, g.w.j.m.stevens@uu.nl

Conflict of interest statement: None to declare.

Abstract

Introduction and Aims. This internationally comparative study examines differences in alcohol consumption between first- and second-generation immigrant and native adolescents. We also investigate to what extent origin and receiving country alcohol per capita consumption rates (APCC) and proportions of heavy episodic drinkers (HED) are associated with immigrant adolescents' alcohol consumption. **Design and Methods.** We used cross-sectional survey data from the 2013/14 Health Behaviour in School-aged Children study. Applying multilevel regression analyses, we investigated the lifetime frequency of alcohol use and drunkenness in 69842 13- to 15-year-olds in 23 receiving countries, with immigrants from over 130 origin countries (82% natives, 6% first-generation immigrants, 12% second-generation immigrants). **Results.** The lifetime frequency of alcohol use was higher among natives than among first- and second-generation immigrants, while no differences were found between the latter two. Lifetime drunkenness was more frequent among first-generation immigrants than among natives and second-generation immigrants. Higher origin country APCC and HED were associated with more frequent lifetime alcohol use and drunkenness among immigrant adolescents. Cross-level interactions revealed that for lifetime frequency of alcohol use, the origin country HED effects were stronger for first- than for second-generation immigrant adolescents. Further, especially for first-generation immigrants, a higher receiving country HED was related to lower lifetime frequencies of alcohol use and drunkenness. **Conclusions.** Our results suggest differences in lifetime frequencies of alcohol use and drunkenness between natives and first- and second-generation immigrant adolescents. Origin country APCC and HED seem to affect immigrant adolescents' alcohol consumption differently than receiving country APCC and HED.

Key words: alcohol consumption, adolescents, immigrants, origin and receiving country alcohol prevalence rates.

Introduction

Adolescent alcohol consumption is common in most European countries, yet drinking patterns vary greatly between and within countries [1]. Studies have found differences in alcohol consumption between native and immigrant adolescents. However, findings concerning the direction of the association between alcohol consumption and immigrant status are mixed [2-5]. Walsh and colleagues [4], for instance, found that first-generation immigrant adolescents from the Former Soviet Union and first- and second-generation Ethiopian immigrants reported higher levels of binge drinking and drunkenness than their Israeli counterparts. On the contrary, another study [3] found no differences in alcohol consumption between immigrant adolescents from a variety of origin countries and natives in Switzerland. These inconsistent findings might be attributed to the fact that studies have focused on different immigrant populations from different origin countries, in different receiving countries and from a variety of immigrant generations (first, second and later) [4,6-8]. Cross-national research comparing the alcohol consumption of native adolescents and immigrant adolescents from different origin countries is scarce.

Social norms and values concerning alcohol consumption differ considerably across nations/cultures [9] and are mirrored by national differences in alcohol consumption [10]. These norms and values are likely to influence individual alcohol consumption [11]. As adolescent immigrants straddle two cultural contexts, that of their origin and receiving country [12], national alcohol prevalence rates in both their origin and receiving country may shape their alcohol consumption. However, differences in alcohol consumption between first- and second-generation immigrant adolescents may also occur. According to Convergence Theory [e.g. 2, 4], alcohol consumption of second-generation immigrants will more strongly resemble that of natives than that of first-generation immigrants. This behavioural drift across immigrant generations has been attributed to greater contact with the receiving culture, which increases the likelihood of adopting normative behaviours of the receiving society and diminishes the influence of the origin country. In line with this, some studies found greater similarities to native adolescents' alcohol consumption among second-generation than among first-generation immigrants [4,8]. Svensson and Hagquist [8], for instance, found that compared to first-generation immigrant adolescents from low-drinking origin countries, their second-generation counterparts showed higher levels of alcohol consumption, resembling the consumption of the Swedish population.

To our knowledge, the current study is the first large-scale cross-national study among representative samples of adolescents to examine: (i) differences in alcohol consumption between first- and second-generation immigrant and native adolescents across multiple receiving countries; and (ii) to what extent origin and receiving country alcohol prevalence rates are associated with the alcohol consumption of first- and second-generation immigrant adolescents. Gaining knowledge on these associations adds to existing theories on the importance of origin and receiving country-level alcohol prevalence rates for immigrant adolescents' alcohol consumption and can help to identify groups of adolescents that are at risk of (frequent) alcohol consumption.

Based on empirical research and the above theory, we hypothesise that compared to first-generation immigrant adolescents, second-generation immigrant adolescents will show a pattern of alcohol consumption that is more similar to native adolescents (Hypothesis 1). Additionally, we hypothesise that higher alcohol prevalence rates in immigrant adolescents' origin and receiving countries will relate to more frequent adolescent alcohol consumption (Hypothesis 2). We further hypothesise a stronger influence of origin country alcohol prevalence rates on the alcohol consumption of first-generation than second-generation immigrant adolescents and a stronger influence of receiving country alcohol prevalence rates on the alcohol consumption of second-generation than first-generation immigrant adolescents (Hypothesis 3).

Methods

Data and Participants

The 2013/14 Health Behaviour in School-aged Children (HBSC) study was carried out in 41 countries in Europe, Canada and Israel. The HBSC study uses a standardised stratified sampling method in all countries to recruit comparable and representative samples. An international research protocol ensured consistency in survey instruments, data collection and procedures, and country-specific ethical requirements were followed [13]. In this survey, a subset of 23 countries collected data on participants' and their parents' origin country and participants' immigrant generation. In order to have a more homogeneous sample with regard to age and due to low levels of alcohol consumption among the youngest age category (age range between 10.5 and 12.5 years), we excluded individuals belonging to this group [$n = 40375$] from an initial sample of 122804 adolescents across these 23 countries. We further removed individuals with missing

data on study variables, such as immigrant generation [$n = 4054$], alcohol consumption [$n = 2366$], and/or family affluence [$n = 6167$]. For immigrant generation, there were no significant differences between included and excluded cases with regard to gender ($\chi^2(1) = 0.44$, $P = 0.51$) and age ($\chi^2(1) = 0.41$, $P = 0.53$). For family affluence and the two dependent variables, missing cases were more prevalent for boys than girls (family affluence: $\chi^2(1) = 125.44$, $P < 0.001$; alcohol use: $\chi^2(1) = 31.46$, $P < 0.001$; drunkenness: $\chi^2(1) = 56.57$, $P < 0.001$). We found age differences between included and excluded cases for alcohol use and family affluence. For alcohol use there were more missing cases among 15-year-olds ($\chi^2(1) = 118.19$, $P < 0.001$), whereas for family affluence, there were more missing cases among 13-year-olds ($\chi^2(1) = 28.51$, $P < 0.001$). Although the percentages of missing values on immigrant generation (4.9 %) and on family affluence (7.5 %) are relatively high, the process of multiple imputation (based mostly on variables that are already in the model as predictors) would have only led to a strengthening of the current estimates. The final sample consisted of 69842 adolescents (51% girls; age range between 12.6 and 16.5 years ($M = 14.56$, $SD = 1.05$)).

Overall, 82% of the respondents were natives, 6% were first-generation immigrants, and 12% were second-generation immigrants. Immigrant adolescents originated from more than 130 different countries. Table 1 shows the percentages of natives and first- and second-generation immigrants per receiving country.

[Table 1 about here]

Measures

Dependent variables. Two indicators of alcohol consumption — frequency of alcohol use and frequency of drunkenness — were assessed using a lifetime recall period [14-15]. As the sample consists of young adolescents and their alcohol consumption is rather low, we did not include a shorter recall period (e.g. 30 days). Self-reported adolescent alcohol consumption is reliable and valid [16-18]. *Lifetime frequency of alcohol use* was measured by the number of days adolescents had drunk alcohol in their lifetime (0 = ‘Never’, 1 = ‘1-2 days’, 2 = ‘3-5 days’, 3 = ‘6-9 days’, 4 = ‘10-19 days’, 5 = ‘20-29 days’, 6 = ‘30 days or more’). *Lifetime frequency of drunkenness* was measured by the number of occasions during their lifetime adolescents had

drunk so much alcohol that they were really drunk (0 = 'No, never', 1 = 'Yes, once', 2 = 'Yes, 2-3 times', 3 = 'Yes, 4-10 times', 4 = 'Yes, more than 10 times').

Independent variable. To determine *immigrant generation*, adolescents were asked where they themselves, their mother and their father were born. If adolescents and both their parents were born in the survey country, they were considered natives. If adolescents were born abroad, they were considered first-generation immigrants. If they were born in the survey country and at least one of their parents was born abroad, they were considered second-generation immigrants. Research has found good validity in adolescent reports of their own and their parents' country of birth [19].

We defined immigrant adolescents' origin country by their mothers' country of birth [c.f. 20] on the basis that familial cultural socialisation of young adolescents is more strongly influenced by their mothers than by their fathers [e.g. 21]. Only if the mother's country of birth was unknown [$n = 3$] or if she was born in the survey country [$n = 3709$], we used the father's country of birth to indicate adolescents' origin country. In each national HBSC survey, adolescents chose from a list of two to six countries of birth or indicated whether they and/or their parents were born in 'another country'. In 12 of the 23 countries, adolescents could specify in which 'other country' they or their parents were born. Therefore, in these 12 survey countries, we could determine the origin country of most of the immigrant adolescents. In the remaining 11 survey countries, we could only define the adolescents' origin countries for those countries that were listed on the survey. Adolescents whose origin country could not be determined were excluded in stage two of the analyses (see below) as their origin country's alcohol prevalence rates could not be assessed.

Two **country-level independent variables** on national alcohol prevalence rates were included from the World Health Organization's (2014) Global Status Report on Alcohol and Health [22]. *Alcohol per capita consumption (APCC)* was measured in litres of pure alcohol per person (aged ≥ 15) per year, recorded between 2008 and 2010 in combination with an estimate of unrecorded per capita (aged ≥ 15) alcohol consumption in 2010 [22, p. 28]. The APCC across receiving countries ranged from 2.80 litres in Israel to 16.80 litres in the Republic of Moldova. Across origin countries, the APCC was lowest in Libya and Pakistan (0.10 litres) and highest in Belarus (17.50 litres). The original APCC values have been rescaled by dividing them by 10.

Heavy Episodic Drinking (HED) assessed the proportion of a country’s adult population (aged ≥ 15) that reported drinking heavily at least once a month. Heavy drinking was defined as “60 or more grams of pure alcohol on at least one single occasion at least monthly” [22, p. 34] and was based on surveys carried out between 2006 and 2010. Across receiving countries, HED was lowest in Italy (5%) and highest in Ireland (37%). Across origin countries, it was lowest in Muslim countries such as Bangladesh, Egypt, Iran, Morocco and Syria (0%) and highest in Austria (39%). The original HED values have been rescaled by dividing them by 100.

Control variables. Analyses controlled for *age* (assessed in years), *gender* (1 = female; 0 = male), and *socioeconomic status* (SES). SES was measured with the Family Affluence Scale [23]. This scale is comprised of six items on material assets in the family. Respondents’ answers were summed into a scale in which higher values indicated higher family affluence. We estimated SES by comparing the individuals’ summary scores on the Family Affluence Scale to all other scores in their respective country or region using a proportional rank [1].

Statistical analysis

All analyses were conducted using SPSS 24.0. We used listwise deletion to deal with missing data and conducted multilevel regression analyses based on maximum likelihood estimation. In stage one of the analyses, we tested differences in alcohol consumption between first- and second-generation immigrant and native adolescents [$n = 69842$], using data with a two-level structure. At the individual level, effects of immigrant generation, age, gender, and socioeconomic status on adolescent alcohol use and drunkenness frequencies were tested. Individuals are clustered within receiving countries, which form the second level of analysis. Even though six percent of the variance in lifetime frequency of alcohol use and four percent of the variance in lifetime frequency of drunkenness stem from differences among schools, we could not account for cluster sampling design effects at the school level, due to model nonconvergence.

First, random intercept models were fitted for the dependent variables to examine whether variance exists at the level of the receiving countries. In all models within this stage, the dependent variables were only allowed to vary across receiving countries as including origin country variation is problematic because for natives the origin and receiving country are equal. Secondly, to determine differences in alcohol consumption between natives, first-generation

immigrants and second-generation immigrants, we included fixed effects of immigrant generation and the control variables (centred around their means) (test of Hypothesis 1). In this model, we allowed effects of immigrant generation to vary across receiving countries to identify possible cross-country differences in the effect of immigration on alcohol consumption.

In stage two of the analyses, we excluded natives, as we compared first- and second-generation immigrants. We also excluded individuals whose origin country we did not know [$n = 3229$] and individuals for whom we did not have information about their origin country's alcohol prevalence rates (APCC and HED) [$n = 162$]. This resulted in a sample size of 9078 immigrant adolescents. To test whether first- and second-generation immigrants are affected differently by origin and receiving country alcohol prevalence rates, we used data with a non-hierarchical four-level structure. Besides including variables on the individual level (immigrant generation, gender, age, and socioeconomic status), we included APCC and HED on two country levels in the models: the receiving and origin country level. As the receiving country level and the origin country level are not clustered within one another, we rely on cross-classified models, treating the two country levels as parallel levels. Additionally, we controlled for the fact that individuals are grouped into immigrant communities. An immigrant community is a group of immigrants who come from the same origin country and live in the same receiving country [for earlier research studying immigrant community effects see e.g. 24]. We first fitted random intercept models to determine whether the dependent variables differed across receiving and origin countries as well as across immigrant communities. Next, to test Hypothesis 2, we entered immigrant generation, the control variables (centred around their means), and the country level variables APCC and HED for origin and receiving countries (also centred around their means) to the models. First, we examined APCC and HED separately (Model 1 and 2), subsequently in a joined model (Model 3), to gain insight in the independence of the effects of APCC and HED. Finally, we tested cross-level interactions between immigrant generation and the country level variables to determine whether APCC (origin/receiving) and HED (origin/receiving) affected first-generation immigrants differently than second-generation immigrants (test of Hypothesis 3). Again, we first entered interactions between immigrant generation and APCC origin/receiving and HED origin/receiving in separate models (Model 4 and 5), and then tested them simultaneously (Model 6).

Results

Differences in alcohol use and drunkenness between first- and second-generation immigrant and native adolescents

The random intercept models showed significant variance in both dependent variables across receiving countries. Five percent of the total variance of lifetime frequency of alcohol use and three percent of the total variance of lifetime frequency of drunkenness could be accounted for by country level effects. The model with fixed effects of immigrant generation (when controlling for age, gender and SES) showed that first- and second-generation immigrants’ lifetime frequency of alcohol use is lower than that of native adolescents (Table 2). First- and second-generation immigrants did not differ in lifetime frequency of alcohol use (not reported in Table 2). For lifetime drunkenness, first-generation immigrant adolescents reported a significantly higher lifetime frequency of drunkenness than both second-generation immigrants (not reported in Table 2) and natives. No differences between second-generation immigrants and natives were found.

For the two outcomes, differences between both first- and second-generation immigrants and natives varied across countries (Table 2). Only for lifetime frequency of drunkenness did differences between first-generation immigrants and their second-generation counterparts vary across countries (not reported in Table 2).

[Table 2 about here]

Associations between origin and receiving country APCC and HED and immigrant adolescents’ alcohol use and drunkenness

For both outcomes, the random intercept model showed significant variance at the individual level, the immigrant community level, and the origin and receiving country levels. Tables 3 and 4 show the lifetime frequency of alcohol use and drunkenness among first- and second-generation immigrants, predicted by the four country level variables when controlling for age, gender and SES. When added to the models separately, origin country APCC and HED positively related to adolescent lifetime frequency of alcohol use and drunkenness (Model 1 and 2, Table 3 and 4). When the four country level predictors were analysed simultaneously, only higher APCC in the origin countries was associated with a higher lifetime frequency of both

outcomes (Model 3, Table 3 and 4). In none of these three models were receiving country APCC and HED associated with lifetime frequency of alcohol use or drunkenness.

For lifetime frequency of alcohol use, we found a positive cross-level interaction between immigrant generation and origin country HED, both in the separate and in the combined model (Model 5 and 6, Table 3). This indicates a stronger positive effect of origin country HED on the lifetime frequency of alcohol use for first- than for second-generation immigrant adolescents. For both outcomes, we found a negative significant interaction between immigrant generation and receiving country HED, both in the separate and combined models (Model 5 and 6, Table 3 and 4). These interactions revealed that for first-generation immigrant adolescents, a higher receiving country HED is more strongly associated with a lower lifetime frequency of alcohol use and drunkenness than for second-generation immigrants. The cross-level interactions that are statistically significant in Model 6 are illustrated graphically in Figure 1, 2 and 3. In each of these figures we have shown the relationships between HED and the predicted outcomes for first- and second-generation immigrants separately. We used the minimum and maximum observed HED values to show the real range of the effect of HED on the predicted outcomes.

[Table 3 and 4 about here]

[Figure 1, 2, and 3 about here]

Discussion

This large-scale internationally comparative study of representative samples of adolescents enabled us to thoroughly study the contributions of immigrant generation (first vs. second) and origin and receiving country alcohol prevalence rates on immigrant adolescents' alcohol consumption. In contrast with previous studies that showed higher levels of risk behaviours, such as bullying and violence among immigrant adolescents in Europe [25], the lower lifetime frequency of alcohol use among first- and second-generation immigrant adolescents as compared with their native peers is noteworthy. Results from the current study, indicative of a dominant role of origin country alcohol consumption rates on immigrant adolescent alcohol consumption, suggest that the low lifetime frequency of alcohol use may be partly due to the influence of cultural norms and values on alcohol consumption. In addition, only for lifetime frequency of drunkenness, did our findings confirm the first hypothesis (suggesting that second-generation

immigrants display alcohol consumption frequencies more similar to those of natives than first-generation immigrants do). This supports Convergence Theory, i.e. that second-generation immigrants have adapted more to the receiving country's habits of getting drunk. The higher lifetime frequency of drunkenness among first-generation immigrants (than among both their second-generation and native peers) highlights the vulnerability of first-generation immigrant adolescents to getting drunk. Drunkenness, as opposed to general alcohol use, may be a manifestation of immigration-related difficulties and stressors that are associated with feelings of rejection, a lack of belonging, difficulties in identity formation, and/or a disadvantageous socioeconomic position [26].

Our findings did not fully support our second hypothesis, that immigrant adolescents are influenced by both origin and receiving country alcohol prevalence rates. Our results rather indicate that for immigrant adolescents' alcohol consumption (both lifetime frequency of alcohol use and drunkenness), alcohol prevalence rates in the origin country are stronger predictors than those in the receiving country. These findings suggest that immigrant adolescents' socialisation concerning alcohol consumption is strongly influenced by their parents and the alcohol drinking behaviour in their parents' origin country. Given the centrality of the influence of friends and peers in adolescent alcohol consumption [27], this finding is surprising. It emphasises the pivotal role of family culture and intergenerational relations [12], particularly as a potentially protective factor in the case of immigrant adolescents' alcohol consumption.

One of the origin country associations was found to be stronger for first- than for second-generation immigrant adolescents, which was partly in line with our last hypothesis. For lifetime frequency of alcohol use, a stronger effect of origin country proportions of heavy episodic drinkers was found for first- than for second-generation immigrant adolescents. This supports the hypothesis that first-generation immigrants are more strongly influenced by drinking behaviours in their origin country than second-generation immigrants.

With respect to receiving country alcohol prevalence rates, we found that especially for first-generation immigrant adolescents, higher proportions of heavy episodic drinkers in the receiving country were associated with lower lifetime frequencies of alcohol use and drunkenness. This finding suggests that especially first-generation immigrant adolescents may tend to reject behavioural norms regarding adult heavy episodic drinking in the receiving country. Parents of first-generation immigrants might be stricter with their children in countries

with high proportions of heavy episodic drinkers to prevent them from adapting to the receiving country's relatively excessive alcohol drinking culture. Parents of second-generation immigrant adolescents might perceive the receiving country's high proportions of heavy episodic drinkers as less alarming as they may be more used to local norms. This finding resembles other studies that have found parents of first-generation immigrants to be less permissive and more authoritative in their parenting styles than parents of second-generation immigrant adolescents [e.g. 28].

Limitations

Four limitations of our study should be noted. First, considering the age of the adolescents, their alcohol consumption was rather low, which may make our results difficult to compare with older age groups. Replicating the study on older adolescents or young adults would be helpful. Second, the HBSC study did not assess the age at migration of first-generation immigrant adolescents. This information could have helped us to determine whether first-generation immigrants were old enough when they left their origin country to have learned about or experienced their origin country's alcohol consumption culture. Therefore, we cannot rule out the possibility that similarities between first- and second-generation immigrant adolescents were due to the fact that many first-generation immigrant adolescents migrated at a young age. However, the observed differences between first- and second-generation immigrant adolescents (for instance regarding the effect of HED of receiving countries on immigrant adolescents' alcohol consumption) suggest that this was not a major limitation of our study.

Third, our sample was diverse and included immigrants from more than 130 origin countries with large differences in alcohol prevalence rates. Although this could be seen as a strength, it also means that some immigrant adolescents originated from countries with extreme alcohol drinking cultures. Alcohol consumption in Muslim countries, for instance, is minimal, which may have influenced our results strongly. Therefore, future studies should differentiate between immigrants from Muslim and non-Muslim countries or countries with high and low alcohol prevalence rates.

Fourth, although our definition of immigrant adolescents' origin country was based on accepted conventions [21], alternative definitions could also have been used. Despite the prominence of maternal cultural socialisation, the origin culture of immigrant fathers is also

likely to have an impact on adolescents with non-immigrant mothers. Therefore, we used the father’s country of birth when the mother’s was unknown or equal to the survey country. Future studies may want to explore whether the use of different definitions of immigrant adolescents’ origin country influences the outcomes.

Conclusion

While immigrant adolescents were found to show lower lifetime frequencies of alcohol use than native adolescents, results also highlight the vulnerability of first-generation immigrant adolescents for drunkenness. The latter finding might reflect higher levels of immigration-related (di)stress and suggests that interventions that aim to reduce drunkenness among adolescents should especially take first-generation immigrants into consideration. However, further research is needed to understand the causes of the relatively high frequency of drunkenness among first-generation immigrant adolescents.

The finding that origin country alcohol prevalence rates influence both first- and second-generation immigrant adolescents more strongly than those of the receiving country, indicates that Convergence Theory is not sufficient to understand differences between immigrant adolescents who belong to different generations. The same is true for the lack of differences in the lifetime frequency of alcohol use between first- and second-generation immigrants. This emphasises the important role of intergenerational relations and the potentially protective role that parents and the parental origin country culture can play in limiting immigrant adolescent alcohol consumption. Future research is warranted to investigate whether our results can be replicated in older age groups while differentiating between immigrants from a variety of origin countries.

References

- [1] Inchley J, Currie D. Growing up unequal: gender and socioeconomic differences in young people's health and well-being. Health Behaviour in School-aged Children (HBSC) study: international report from the 2013/2014 survey. WHO, 2016. Health policy for children and adolescents. 2016(7).
- [2] Sznitman SR, Baron-Epel O, Boker-Keinan L. Convergence of drinking patterns of young Russian immigrants and veteran Israelis decades after mass immigration: Results from a bidirectional acculturation model. *J Stud Alcohol Drugs* 2013;74:437-46.
- [3] Vazsonyi AT, Trejos-Castillo E, Huang L. Are developmental processes affected by immigration? Family processes, internalizing behaviors, and externalizing behaviors. *J Youth Adolesc* 2006;35:795-809.
- [4] Walsh SD, Djalovski A, Boniel-Nissim M, Harel-Fisch Y. Parental, peer and school experiences as predictors of alcohol drinking among first and second generation immigrant adolescents in Israel. *Drug Alcohol Depend* 2014;138:39-47.
- [5] Walsh SD, Harel-Fisch Y, Fogel-Grinvald H. Parents, teachers and peer relations as predictors of risk behaviors and mental well-being among immigrant and Israeli born adolescents. *Soc Sci Med* 2010;70:976-84.
- [6] Amundsen EJ, Rossow I, Skurtveit S. Drinking pattern among adolescents with immigrant and Norwegian backgrounds: A two-way influence? *Addiction* 2005;100:1453-63.
- [7] Molcho M, Cristini F, Nic Gabhainn S, Santinello M, Moreno M, Gasper de Matos M, Bjarnason T, Baldassari D, Due P. Health and well-being among child immigrants in Europe. *Eurohealth* 2010;16:20.
- [8] Svensson M, Hagquist C. Adolescent alcohol and illicit drug use among first-and second-generation immigrants in Sweden. *Scand J Soc Med* 2010;38:184-91.
- [9] Oetting ER, Donnermeyer JF, Trimble JE, Beauvais F. Primary socialization theory: Culture, ethnicity, and cultural identification. The links between culture and substance use. IV. *Subst Use Misuse* 1998;33:2075-107.
- [10] Popova S, Rehm J, Patra J, Zatonski W. Comparing alcohol consumption in central and eastern Europe to other European countries. *Alcohol Alcohol* 2007;42:465-73.

[11] Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. *Clin Psychol Rev* 2005;25:841-61.

[12] Kwak K. Adolescents and their parents: A review of intergenerational family relations for immigrant and non-immigrant families. *Hum Dev* 2003;46:115-36.

[13] Inchley J, Currie D. Growing up unequal: gender and socioeconomic differences in young people's health and well-being. *Health Behaviour in School-aged Children (HBSC) study: international report from the 2013/2014 survey*. WHO, 2016. Health policy for children and adolescents. 2016(7).

[14] Ekholm O. Influence of the recall period on self-reported alcohol intake. *Eur J Clin Nutr* 2004;58:60-3.

[15] Gmel G, Daeppen JB. Recall bias for seven-day recall measurement of alcohol consumption among emergency department patients: implications for case-crossover designs. *J Stud Alcohol Drugs* 2007;68:303-10.

[16] Brener ND, Billy JO, Grady WR. Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. *J Adolesc Health* 2003;33:436-57.

[17] Campanelli PC, Dielman TE, Shope JT. Validity of adolescents' self-reports of alcohol use and misuse using a bogus pipeline procedure. *Adolescence* 1987;22:7-22.

[18] Lintonen T, Ahlström S, Metso L. The reliability of self-reported drinking in adolescence. *Alcohol Alcohol* 2004;39:362-8.

[19] Nordahl H, Krølner R, Páll G, Currie C, Andersen A. Measurement of ethnic background in cross-national school surveys: agreement between students' and parents' responses. *J Adolesc Health* 2011;49:272-7.

[20] Stevens GW, Walsh SD, Huijts T, Maes M, Madsen KR, Cavallo F, Molcho M. An internationally comparative study of immigration and adolescent emotional and behavioral problems: Effects of generation and gender. *J Adolesc Health* 2015;57:587-94.

[21] Knight GP, Berkel C, Umaña-Taylor AJ, Gonzales NA, Ettekal I, Jaconis M, Boyd BM. The familial socialization of culturally related values in Mexican American families. *J Marriage Fam* 2011;73:913-25.

[22] World Health Organization. Global status report on alcohol and health. World Health Organization; 2014.

- [23] Currie C, Molcho M, Boyce W, Holstein B, Torsheim T, Richter M. Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale. *Soc Sci Med* 2008;66:1429-36.
- [24] Van Tubergen F, Maas I, Flap H. The economic incorporation of immigrants in 18 Western societies: Origin, destination, and community effects. *AmSociol Rev* 2004;69:704-27.
- [25] Walsh SD, De Clercq B, Molcho M, Harel-Fisch Y, Davison CM, Madsen KR, Stevens GW. The relationship between immigrant school composition, classmate support and involvement in physical fighting and bullying among adolescent immigrants and non-immigrants in 11 countries. *J Youth Adolesc* 2016;45:1-6.
- [26] Kirmayer LJ, Narasiah L, Munoz M, Rashid M, Ryder AG, Guzder J, Hassan G, Rousseau C, Pottie K. Common mental health problems in immigrants and refugees: general approach in primary care. *CMAJ* 2011;183:E959-67.
- [27] Kuntsche E, Jordan MD. Adolescent alcohol and cannabis use in relation to peer and school factors: Results of multilevel analyses. *Drug Alcohol Depend* 2006;84:167-74.
- [28] Driscoll AK, Russell ST, Crockett LJ. Parenting styles and youth well-being across immigrant generations. *J Fam Issues* 2008;29:185-209.

Table 1. *Percentages of natives, first-generation and second-generation immigrants across receiving countries*

Country	Native	First-generation	Second-generation	Total N
Albania	94.2	5.4	0.3	3174
Belgium (Flemish)	77.3	7.7	15.0	2514
Belgium (Walloon)	64.4	11.4	24.0	3284
Bulgaria	96.7	1.3	2.0	2910
Croatia	74.7	3.6	21.7	3166
Denmark	81.0	5.3	13.8	2283
Estonia	83.8	2.0	14.1	2516
Finland	91.2	2.8	6.0	3638
Germany	72.2	4.9	22.9	3927
Greece	79.9	5.9	14.2	2603
Iceland	88.9	6.0	5.1	5877
Ireland	72.2	13.6	14.2	2621
Israel	65.0	6.3	28.6	1751
Italy	88.0	4.3	7.7	2493
Luxembourg	36.1	20.8	43.1	1823
Moldova	92.6	1.9	5.5	3010
The Netherlands	77.2	4.3	18.5	2561
Romania	95.8	2.2	1.9	2323
Scotland	89.2	5.5	5.2	3441
Slovenia	83.1	4.7	12.1	3097
Spain	80.1	9.5	10.4	5068
Ukraine	87.5	1.4	11.1	2769
Wales	91.1	3.7	5.2	2993
Total	82.1	5.7	12.1	69842

Table 2. Unstandardized beta coefficients of alcohol consumption among native, first- and second-generation immigrant adolescents ($n = 69,842$)

	Lifetime frequency alcohol use b (SE)	Lifetime frequency drunkenness b (SE)
<i>Coefficients</i>		
Intercept (random)	1.50 (0.10)***	0.47 (0.03)***
<i>Individual level</i>		
First-generation ^a	-0.21 (0.08)*	0.10 (0.04)*
Second-generation ^a	-0.21 (0.07)*	0.01 (0.03)
<i>Control variables</i>		
Age	0.64 (0.01)***	0.26 (0.00)***
Gender ^b	-0.19 (0.01)***	-0.11 (0.01)***
SES	0.41 (0.02)***	0.10 (0.01)***
<i>Random slope variance:</i>		
First generation	0.11 (0.04)**	0.04 (0.01)*
Second generation	0.11 (0.04)**	0.01 (0.01)*
<i>Variances</i>		
Individual level	3.12 (0.02)***	0.81 (0.00)***
Receiving country	0.22 (0.07)**	0.03 (0.01)**

Note: *** $P < 0.001$; ** $P < 0.01$; * $P < 0.05$; ^aReference category = natives; ^bReference category = boys; Models are based on maximum likelihood estimation. SES, socioeconomic status.

Table 3. *Explaining lifetime alcohol use among immigrants by APCC and HED of receiving and origin countries (n = 9078)*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b(SE)
<i>Coefficients</i>						
Intercept (random)	1.33 (0.09)***	1.31 (0.09)***	1.34 (0.09)***	1.33 (0.09)***	1.30 (0.09)***	1.32 (0.09)***
<i>Individual level</i>						
First-generation ^a	0.00 (0.04)	-0.00 (0.04)	0.00 (0.04)	0.00 (0.04)	0.04 (0.05)	0.05 (0.05)
<i>Control variables</i>						
Age	0.54 (0.02)***	0.54 (0.02)***	0.54 (0.02)***	0.54 (0.02)***	0.54 (0.02)***	0.54 (0.02)***
Gender ^b	-0.15 (0.04)***	-0.15 (0.04)***	-0.15 (0.04)***	-0.15 (0.04)***	-0.15 (0.04)***	-0.15 (0.04)***
SES	0.44 (0.06)***	0.44 (0.06)***	0.44 (0.06)***	0.44 (0.06)***	0.43 (0.06)***	0.43 (0.06)***
<i>Country-level predictors</i>						
APCC Origin	0.52 (0.11)***		0.55 (0.14)***	0.46 (0.12)***		0.63 (0.16)***
APCC Receiving	0.22 (0.32)		0.34 (3.47)	0.23 (0.34)		0.36 (0.37)
HED Origin		1.33 (0.46)**	-0.17 (0.55)		0.53 (0.51)	-1.10 (0.61)
HED Receiving		-0.46 (0.74)	-0.71 (0.79)		0.18 (0.79)	-0.11 (0.82)
First*APCC Origin ^a				0.11 (0.11)		-0.17 (0.14)
First*APCC Receiving ^a				0.00 (0.23)		0.81 (0.23)
First*HED Origin ^a					1.42 (0.42)**	1.81 (0.56)**
First*HED Receiving ^a					-1.26 (0.45)**	-1.30 (0.46)**
<i>Variances</i>						
Individual level	2.81 (0.04)***	2.81 (0.04)***	2.81 (0.04)***	2.81 (0.04)***	2.80 (0.04)***	2.81 (0.04)***
Origin country	0.05 (0.02)*	0.09 (0.03)**	0.05 (0.02)*	0.05 (0.02)*	0.09 (0.03)**	0.05 (0.02)*
Receiving country	0.10 (0.05)*	0.11 (0.05)*	0.11 (0.05)*	0.10 (0.05)*	0.11 (0.05)*	0.11 (0.05)*
Community	0.08 (0.02)***	0.09 (0.03)***	0.08 (0.02)***	0.09 (0.02)***	0.10 (0.03)***	0.09 (0.02)***

Note: *** $P < 0.001$; ** $P < 0.01$; * $P < 0.05$; ^aReference category = second-generation immigrants; ^bReference category = boys; Models are based on maximum likelihood estimation; beta coefficients are unstandardised. APCC, alcohol per capita consumption rates; HED, heavy episodic drinking; SES, socioeconomic status.

Table 4. Explaining lifetime drunkenness among immigrants by APCC and HED in receiving and origin countries ($n = 9078$)

	Model 1 b (SE)	Model 2 b (SE)	Model 3 b (SE)	Model 4 b (SE)	Model 5 b (SE)	Model 6 b (SE)
<i>Coefficients</i>						
Intercept (random)	0.49 (0.04)***	0.49 (0.04)***	0.49 (0.04)***	0.49 (0.04)***	0.48 (0.04)***	0.48 (0.04)***
<i>Individual level</i>						
First-generation ^a	0.07 (0.02)**	0.07 (0.02)**	0.07 (0.02)**	0.07 (0.02)**	0.09 (0.02)***	0.09 (0.02)***
<i>Control variables</i>						
Age	0.24 (0.01)***	0.24 (0.01)***	0.24 (0.01)***	0.24 (0.01)***	0.24 (0.01)***	0.24 (0.01)***
Gender ^b	-0.08 (0.02)***	-0.08 (0.02)***	-0.08 (0.02)***	-0.08 (0.02)***	-0.08 (0.02)***	-0.08 (0.02)***
SES	0.10 (0.03)**	0.10 (0.03)**	0.10 (0.03)**	0.10 (0.03)**	0.10 (0.03)**	0.10 (0.03)**
<i>Country-level predictors</i>						
APCC Origin	0.20 (0.04)***		0.19 (0.06)**	0.19 (0.05)**		0.18 (0.07)**
APCC Receiving	0.14 (1.55)		0.24 (0.16)	0.12 (0.17)		0.21 (0.17)
HED Origin		0.56 (0.19)**	0.03 (0.22)		0.47 (0.22)*	-0.02 (0.26)
HED Receiving		-0.44 (0.36)	-0.65 (0.37)		-0.19 (0.37)	-0.40 (0.37)
First*APCC Origin ^a				0.02 (0.05)		0.02 (0.07)
First*APCC Receiving ^a				0.04 (0.12)		0.10 (0.12)
First*HED Origin ^a					0.13 (0.22)	0.06 (0.29)
First*HED Receiving ^a					-0.56 (0.24)*	-0.61 (0.24)*
<i>Variances</i>						
Individual level	0.80 (0.01)***	0.80 (0.01)***	0.80 (0.01)***	0.80 (0.01)***	0.80 (0.01)***	0.80 (0.01)***
Origin country	0.00 (0.00)	0.01 (0.00)*	0.00 (0.00)	0.00 (0.00)	0.01 (0.00)	0.00 (0.00)
Receiving country	0.03 (0.01)*	0.03 (0.01)*	0.02 (0.01)*	0.03 (0.01)*	0.02 (0.01)	0.02 (0.01)
Community	0.01 (0.01)*	0.01 (0.01)*	0.01 (0.01)*	0.01 (0.01)*	0.01 (0.01)*	0.01 (0.01)*

Note: *** $P < 0.001$; ** $P < 0.01$; * $P < 0.05$; ^aReference category = second-generation immigrants; ^bReference category = boys; Models are based on maximum likelihood estimation; beta coefficients are unstandardised. APCC, alcohol per capita consumption rates; HED, heavy episodic drinking; SES, socioeconomic status.

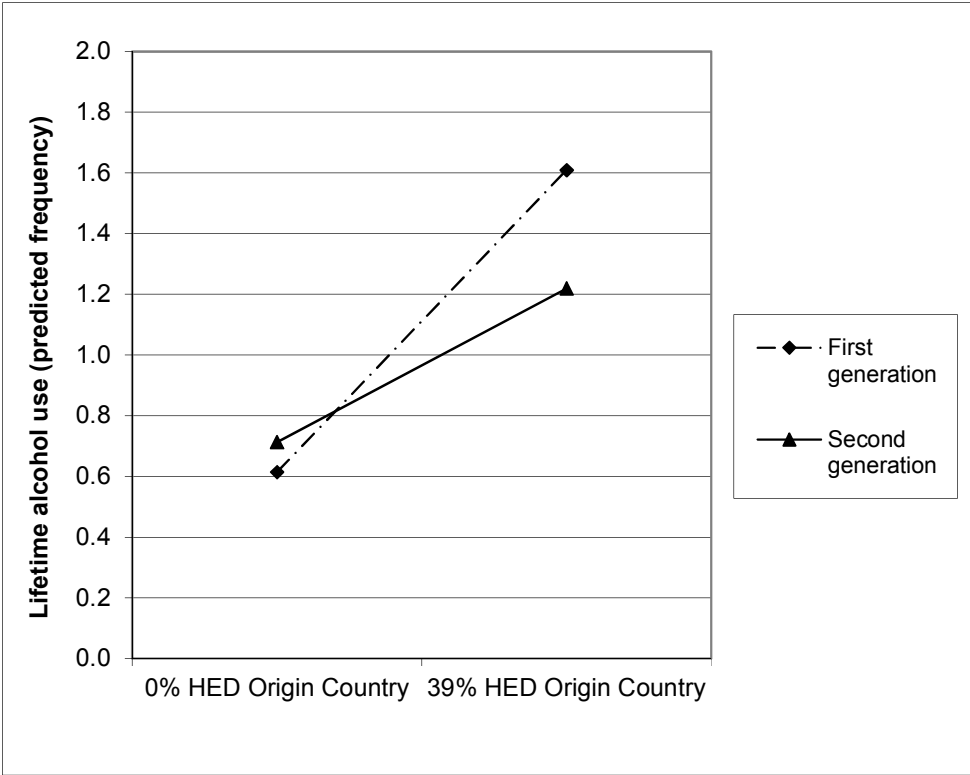


Figure 1. *Difference between first- and second-generation immigrants in the impact of origin country HED on lifetime frequency of alcohol use (n = 9078).* Note: Predicted frequencies were estimated based on Model 6 (Table 3). Effects for the minimum and maximum observed HED values are shown. HED, heavy episodic drinking.

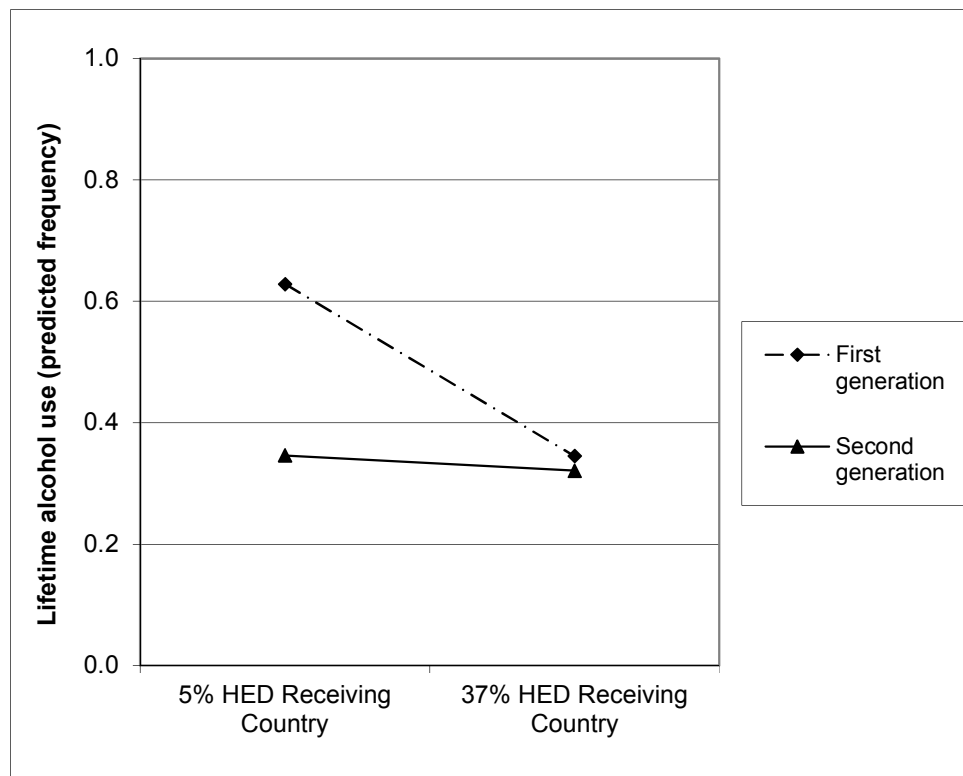


Figure 2. Difference between first- and second-generation immigrants in the impact of receiving country HED on lifetime frequency of alcohol use ($n = 9078$). Note: Predicted frequencies were estimated based on Model 6 (Table 3). Effects for the minimum and maximum observed HED values are shown. HED, heavy episodic drinking.

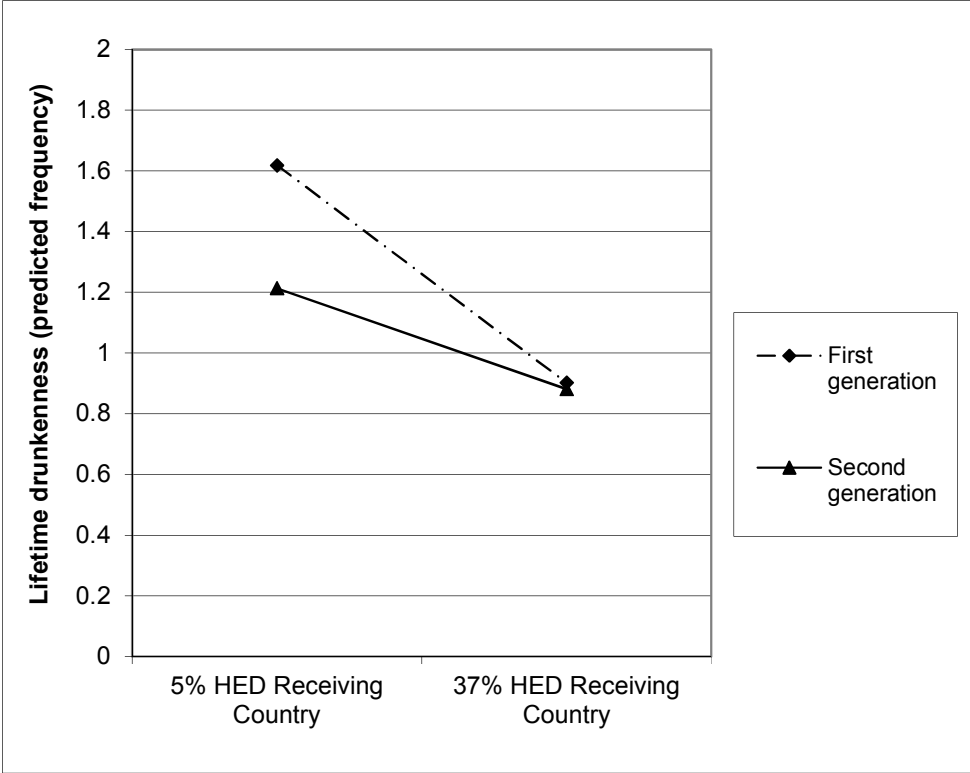


Figure 3. Difference between first- and second-generation immigrants in the impact of receiving country HED on lifetime frequency drunkenness (n = 9078). Note: Predicted frequencies were estimated based on Model 6 (Table 4). Effects for the minimum and maximum observed HED values are shown. HED, heavy episodic drinking.